IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

n re Application of:

PATENAUDE, Francois; DUFOUR, Martial

Serial No.:

09/503,834

Filed:

February 15, 2000

Title:

NOISE FLOOR LEVEL ESTIMATION

Group:

2863

Examiner:

Demetrius R. PRETLOW

Attorney Ref.:

PAT 1952B-2 US

September 22, 2005

Commissioner for Patents United States Patent and Trademark Office **Customer Service Window** Randolph Building 401 Dulany Street Alexandria, Virginia 22314, U.S.A.

Attention: Office of Petitions

Dear Sir:

RE-SUBMISSION OF PETITION FOR REVIVAL OF AN APPLICATION FOR PATENT **ABANDONED UNINTENTIONALLY UNDER 37 CFR 1.137(b)**

On December 17, 2004, applicant submitted a Petition For Revival of an Application for Patent Abandoned Unintentionally Under 37 CFR 1.137(b). Enclosed is a copy of our submission, together with the Auto-Reply Facsimile Transmission received from the United States Patent and Trademark Office.

Please advise when we can expect a decision on our Petition to Revive. Thank you.

Respectfully submitted, François RATENAUDE et al.

Anne Kinsman

Reg. No. 45,291

Borden Ladner Gervais LLP 100 Queen Street, Suite 1100

Ottawa, ON Canada K1P 1J9

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USPTO 12/17/2004 11:33 AM PAGE 1/001 Fax Server Foreply fax to +813 7873558 COMPANY:

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Anne Kinsman I hereby certify that these papers, transmitted to the Patent and Mag

DATE: December 17, 2004

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United States Patent and Trademark Office

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FROM:

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703-872-9306 December 17, 2004 L. Anne Kinsman

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OUR FAX NUMBER:

(613) 787-3558

RE:

United States Patent Appin No. 09/503,834
Title: NOISE FLOOR LEVEL ESTIMATION
Inventor(s): PATENAUDE, Francola; DUFOUR, Martial
Our File: PAT 1982B-2 US

NUMBER OF PAGES, INCLUDING THIS PAGE: _____ CONFIRMATION TO FOLLOW: NONE 15

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IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Application of:

PATENAUDE, Francois; DUFOUR, Martial

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February 15, 2000

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NOISE FLOOR LEVEL ESTIMATION

Group:

2863

Examiner:

PRETLOW, Demetrius R.

Attorney Ref.:

PAT 1952B-2 US

Customer No.:

23051

December 17, 2004

Commissioner for Patents P.O. Box 1450 Alexandria VA 22313-1450 U.S.A.

Attention: Mail Stop Petition

<u>PETITION FOR REVIVAL OF AN APPLICATION FOR PATENT ABANDONED UNINTENTIONALLY UNDER 37 CFR 1.137(b)</u>

This is in response to the Notice of Abandonment dated September 17, 2004, a partial copy of which was received in our offices on December 16, 2004.

Applicant respectfully submits herewith a true copy of our Amendment, dated May 24, 2004, together with our facsimile transmission page which indicates that the documents were successfully transmitted to the United States Patent and Trademark Office on May 24, 2004. Applicant respectfully requests that the application be revived without any additional fees.

Please acknowledge receipt of this submission.

No fees are believed due. However, the Commissioner is hereby authorized to charge to Deposit Account Number 501593 any required fees for processing this request.

Respectfully submitted,

D...

L. Anne Kinsman Reg. No. 45,291

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1. Facsimile Transmission Report

2. Facsimile Cover Page (which includes Certificate of Facsimile Transmission)

3. Amendment dated May 24, 2004



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IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

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PATENAUDE, François; DUFOUR, Martial

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Title:

NOISE FLOOR LEVEL ESTIMATION

Group:

2863

Examiner:

PRETLOW, Demetrius R.

Attorney Ref.:

PAT 1952B-2 US

Customer No.:

23051

May 24, 2004

Mail Stop Amendment Commissioner for Patents 2011 South Park Place Crystal Plaza Two Lobby Room 1B03 Arlington, Virginia 22202 U.S.A.

AMENDMENT

Dear Sirs:

In response to the Office Action dated February 24, 2004 please amend the above-identified application as follows:

Amendments to the Claims are reflected in the listing of the claims which begins on page 2 of this paper.

Remarks/Arguments begin on page 11 of this paper.

Amendments to the Claims:

This listing of claims will replace all prior version, and listings, of the claims in the application:

Listing of Claims:

- 1. (currently amended) A method of estimating the noise floor of a <u>continuous</u> wideband analogue signal comprising the steps:
 - a. representing the continuous <u>wideband analogue</u> signal as a series of discrete frequency and amplitude values;
 - b. creating a histogram based on the discrete frequency and amplitude values by:

 establishing a lowest bin representing the lowest integer value of the discrete
 series representing the wideband signal,
 establishing a highest bin representing the highest integer value of the discrete
 series representing the wideband signal,
 establishing bins for each integer value between the lowest and highest bins,
 and
 incrementing the value of at least one bin when there is an upward or
 downward crossing of the bin by at least one segment of the series
 representing the wideband signal; and
 - c. deriving a noise floor estimate from characteristics of the histogram.
- 2. (currently amended) The noise floor estimation method of claim 1 wherein the method of obtaining the series of discrete frequency and amplitude values step of representing the continuous signal includes the steps of:
 - a. sampling a-the received wideband signal by using a plurality of analogue-todigital converters to generate a series of output signals;
 - b. windowing the output signals of the analogue-to-digital converters;
 - c. applying a mathematical transform to the results of the windowing to obtain a series of discrete frequency values;
 - d. converting an-the amplitude of each discrete frequency value to log-domain representation; and

- e. rounding the log-domain representation of the amplitude for each discrete frequency value to the nearest integer value to generate a discrete amplitude value.
- 3. (currently amended) The noise floor estimation method of claim 2 wherein the step of windowing process-includes the steps of:
 - selecting a discrete valued weighting function;
 - b. multiplying the value of each output signal of the series by a corresponding element of the discrete weighting function.
- 4. (currently amended) The noise floor estimation method of claim 2 wherein the mathematical transform used is a Fast-discrete Fourier Transform.
- 5. (currently amended) The noise floor estimation method of claim 2 wherein the step of converting the amplitude of each value of the discrete frequency series is converted to log domain representation by includes multiplying 20 by the base 10 logarithm of the magnitude of the element-amplitude.
- 6. (original) The noise floor estimation method of claim 2 wherein the log domain representation of the amplitudes results in the amplitudes being expressed as decibel (dB) values.
- 7. (original) The noise floor estimation method of claim 2 wherein the log domain representation of the amplitudes results in the amplitudes being expressed as decibel milliwatt (dBm) values.
- 8. (cancelled)
- 9. (currently amended) The noise floor estimation method of claim 81 wherein the step of deriving the noise floor estimate from the characteristics of the histogram includes the steps of:
 - a. defining the lowest dB bin as a starting point
 - b. determining the next lowest valued local maximum on the histogram;
 - c. performing a Y test on the determined maximum;
 - d. repeating steps b and c until the Y test fails;

- e. setting the noise floor by adding an offset to the dB value of the maximum of the histogram that caused the Y test failure.
- 10. (currently amended) The noise floor estimation method of claim 9 wherein performing the Y test includes the steps of:
 - examining all points in the next Y dB;
 - b. considering the test a pass when a point exists in the next Y dB which has a higher value than the starting point;
 - c. considering the test a fail when no point exists in the next Y dB which has a higher value than the starting point.
- 11. (original) The noise floor estimation method of claim 10, wherein Y is 3 dB.
- 12. (original) The noise floor estimation method of claim 9, wherein the offset is determined based on observed characteristics of the signal and the windowing process' discrete weighting function.
- 13. (original) The noise floor estimation method of claim 12, wherein the offset is selected from the group of 2 dB for a rectangular window, 2.75 dB for a Hanning window, 3 dB for a Blackman window, and 3.2 dB for a flat top window.
- 14. (currently amended) <u>A method of estimating the noise floor of a continuous</u>
 wideband analogue signal comprising The noise floor estimation method of claim 1, wherein the step of creating the histogram includes the steps of:
 - representing the continuous wideband analogue signal as a series of discrete
 frequency and amplitude values;
 - b. creating a histogram based on the discrete frequency and amplitude values by:
 - establishing a lowest bin representing the lowest integer dB value of the discrete series representing the wideband signal;
 - establishing a highest bin representing the highest integer dB value of the discrete series representing the wideband signal;
 - e----establishing bins for each integer dB value between the lowest and highest bins so that there are a total of MK bins;

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d.——incrementing the bins for each time an element in the discrete series falls into the bin; and

- c. deriving a noise floor estimate from characteristics of the histogram.
- 15. (currently amended) The noise floor estimation method of claim 14, wherein the step of deriving the noise floor estimate from the characteristics of the histogram includes the steps of:
 - a. sorting the elements of the histogram in decreasing order of amplitude to create a sorted vector;
 - b. reducing the size of the sorted linear vector from MK to M by summing groups of K consecutive elements of the sorted linear vector for achieving a more discretised amplitude representation;
 - c. applying one of a log-likelihood function, and a quasi log-likelihood function, to the M elements of the sorted linear vector to achieve a discrete function L(k);
 - d. subtracting L(k) from a multiple (C) of a discrete penalty function p(k) to obtain the function -L(k)+Cp(k);
 - e. identifying the index, denoted by $^{q}{}_{\rm NF}$, at which the minimum of the $-L(k)+C\,p(k)$ equation is achieved; and
 - f. computing the noise floor level estimate per $\overline{\text{FFT}}$ bin by dividing the mean of the $M-q_{NF}-1$ smallest values of the M sorted vector by K.
- 16. (original) The noise floor estimation method of claim 15, wherein M is considerably larger than K.
- 17. (original) The noise floor estimation method of claim 16, wherein M = 64.
- 18. (original) The noise floor estimation method of claim 16, wherein K=8.

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19. (original)

The noise floor estimation method of claim 15 wherein

$$L(k) = K \ln \left[\frac{\prod_{i=k+1}^{M} l_i}{\left(\frac{1}{M-k} \sum_{i=k+1}^{M} l_i \right)^{M-k}} \right]$$

L(k) is represented by the quasi-log-likelihood function k is the index of the function.

- 20. (original) The noise floor estimation method of claim 15, wherein the penalty function is a polynomial.
- 21. (original) The noise floor estimation method of claim 15, wherein the penalty function is represented by the second order polynomial function

$$p(k) = \left[3.76 \left(\frac{M - 1 - k}{M - 1} \right)^{2} + 1.43 \left(\frac{M - 1 - k}{M - 1} \right) \right] MK$$

- 22. (original) The noise floor estimation method of claim 15, wherein the constant C is -2.6.
- 23. (currently amended) A wideband analogue signal noise floor estimation apparatus comprising:
 - a. a digitizer module for creating a <u>discrete series</u> representation of the <u>a</u> continuous <u>wide band analogue</u> signal, the representation comprised of discrete frequency and amplitude values;
 - b. a histogram module for generating a histogram based on the discrete frequency and amplitude values; the histogram module including

a low bin establishing element for creating a low valued bin to represent the integer value of lowest valued element in the discrete series representing the wideband signal.

a high bin establishing element for creating a high valued bin to represent the integer value of the highest valued element in the discrete series representing the wideband signal.

a tertiary bin creation element for creating bins for each integer value between the lowest and highest bins, and

Application No. 09/882,825 Amendment dated: May 24, 2004 Page 7 of 11

a bin count incrementing element for incrementing a value of a bin when there is an upward or downward crossing of the bin by at least a segment of the discrete series; and

- c. an estimation module for deriving an estimate of the noise floor of the wideband signal based on the characteristics of the histogram.
- 24. (original) The noise floor estimation apparatus of claim 23, wherein the digitizer module further comprises:
 - a. a sampling module including a plurality of analogue-to-digital converters for generating a series of output signals;
 - b. a windowing module for weighing the output signals of the sampling element to generate weighed output signals;
 - a transforming module for applying a mathematical transform to the weighed output signals to create a signal comprised of discrete frequency values that represent the original signal;
 - d. an amplitude domain converter for converting the linear amplitude values to log-domain representation; and
 - e. an amplitude discretizing module for representing the output of the amplitude domain conversion element as a sequence of integer valued amplitude levels.
- 25. (original) The noise floor estimation apparatus of claim 24, wherein the windowing module further includes a weighting element for multiplying each value of the output series by a corresponding element of a preselected discrete valued weighting function.
- 26. (original) The noise floor estimation apparatus of claim 24, wherein the transforming module applies a Fast Fourier Transform.
- 27. (original) The noise floor estimation apparatus of claim 24, wherein the amplitude discretizing module is constructed to convert each amplitude value of the discrete frequency series to 20 times base 10 logarithm of the magnitude of the value.
- 28. (original) The noise floor estimation apparatus of claim 24, wherein the amplitude domain converter outputs amplitude values as decibel (dB) values.

Application No. 09/882,825 Amendment dated: May 24, 2004 Page 8 of 11

- 29. (original) The noise floor estimation apparatus of claim 24, wherein the amplitude domain converter outputs amplitude values as decibel milliwatt (dBm) values.
- 30. (cancelled)
- 31. (original) The noise floor estimation apparatus of claim 23, wherein the estimation module further includes:
 - a. a maxima finding element for finding the next left most maximum from a given starting point, that in the absence of previous data takes the lowest dB bin as a starting point;
 - b. a Y test element for performing a Y test;
 - c. a decision element for calling upon the maxima finding element until the Y test element reports a fail; and
 - d. a noise floor setting element for providing a noise floor estimate by adding an offset to the dB value reported by the maxima finding element that caused the Y test element to report a fail.
- 32. (original) The noise floor estimation apparatus of claim 31, wherein the Y test element further includes:
 - a. an examination element for searching the Y dB to the right of the given starting point for a value higher than the starting point; and
 - b. a reporting element for reporting a fail when no point exists in the next Y dB that has a higher value than the starting point and reports a pass if there is a value in the next Y dB that is greater in value than the starting point.
- 33. (original) The noise floor estimation apparatus of claim 32, wherein Y is set at 3 dB.
- 34. (original) The noise floor estimation apparatus of claim 31, wherein the offset used by the noise floor setting element is based on observed characteristics of the signal and the windowing process' discrete weighting function.
- 35. (original) The noise floor estimation apparatus of claim 34, wherein the offset is selected from the group of 2 dB for a rectangular window, 2.75 dB for a Hanning window, 3 dB for a Blackman window, and 3.2 dB for a flat top window.

Application No. 09/882,825 Amendment dated: May 24, 2004 Page 9 of 11

(currently amended)

36.

appara	atus comprising: The neise fleer estimation apparatus of claim 23, wherein the
ristog r	ram modulo furthor includos:
	a. a digitizer module for creating a discrete series representation of a continuous
	wide band analogue signal, the representation comprised of discrete frequency and
	amplitude values;
	b. a histogram module for generating a histogram based on the discrete
	frequency and amplitude values, the histogram module including
	a. a low bin establishing element for creating a low valued bin to represent the
	lowest integer dB values of the discrete series representing the wideband signal;
	b.——a high bin establishing element for creating a high valued bin to represent the
	highest integer dB value of the discrete series representing the wideband signal;
	ea tertiary bin creation element for creating bins for each integer dB value
	between the lowest and highest bins; and
	d.—a bin count incrementing element for incrementing the value of a bin for each

A wideband analogue signal noise floor estimation

37. (original) The noise floor estimation apparatus of claim 23, wherein the estimation module further includes:

time an element in the discrete series falls into the bin.

- a. a sorting element for creating a vector containing the discrete amplitudes of the input signal in decreasing order;
- b. a vector size reducing element for reducing the size of the sorted linear vector from MK elements to M elements by summing groups of K consecutive elements of the sorted linear vector to achieve a more discretised amplitude representation;
- c. a log-likelihood element for applying a log-likelihood, or a quasi log-likelihood function, to the M elements of the sorted linear vector output from the vector reducing element to achieve a discrete function L(k);
- d. a penalty function element for subtracting the discrete function L(k) from a multiple (C) of a discrete penalty function p(k) to obtain the function -L(k)+Cp(k) (PLLM function);

Application No. 09/882,825 Amendment dated: May 24, 2004 Page 10 of 11

- e. an index identification element for identifying the index at which the minimum of the PLLM function, ${}^{-}L(k) + C\,p(k)$, is achieved and identifying the index, denoted by $q_{\rm NF}$, at which the minimum of the ${}^{-}L(k) + C\,p(k)$ equation is achieved; and f. a noise floor setting element for providing a noise floor estimate by dividing the mean of the ${}^{M}-q_{\rm NF}-1$ smallest values of the M sorted vector by K.
- 38. (original) The noise floor estimation apparatus of claim 37, wherein the penalty function element is constructed to apply a polynomial as the penalty function.
- 39. (original) The noise floor estimation apparatus of claim 37, wherein the penalty function element is constructed to apply the second order polynomial function

$$p(k) = \left[3.76 \left(\frac{M - 1 - k}{M - 1} \right)^2 + 1.43 \left(\frac{M - 1 - k}{M - 1} \right) \right] MK \text{ as the penalty function.}$$

Remarks/Arguments

Applicant requests that the application be amended as above described. Claims 1-5, 9, 10, 14, 15, 23 and 36 have been amended. Claims 8 and 30 have been cancelled. Claims 1-7, 9-29 and 31-39 are currently pending in the application. No new claims have been added.

In the Office Action dated February 24, 2004, the Examiner rejected claims 1 and 23 under 35 U.S.C. 102(a) as being anticipated by U.S. Patent No. 6,240,282 to Kleider et al. The Applicant thanks the Examiner for finding claims 2-22 and 24-39 allowable if rewritten in independent form to include all the limitations of the base claim and any intervening claims. Accordingly, claim 1 has been amended to include the subject matter recited in cancelled claim 8; claim 14 has been rewritten independent form; claim 23 has been amended to include the subject matter of cancelled claim 30; and claim 36 has been rewritten in independent form. No new matter has been added, though Applicant has recited an "upward and downward crossing", as opposed to a "positive slope", as supported at p. 10, line 28 of the application as filed. Applicant submits that nothing in Kleider et al. teaches or suggests incrementing a bin value in response to an upward or downward crossing, or falling into, the bin of a series segment. Therefore, Applicant submits that amended claims 1, 14, 23 and 36 are clearly distinguished from Kleider et al., and withdrawal of the Examiner's rejection under 35 U.S.C. 102(a) is respectfully requested.

Claims 2 - 5, 9, 10 and 15 have been amended to accord with the changes to claims 1 and 14, and to provide proper antecedent basis for all elements.

Therefore, Applicant submits that the application is now in condition for allowance, and favourable action to that end is respectfully requested.

BORDEN LADNER GERVAIS, LLP World Exchange Plaza 100 Queen Street, Suite 1100 Ottawa ON K1P 1J9 Canada

Telephone No. (613) 787-3519 Facsimile No. (613) 787-3558 E-mail: akinsman@blgcanada.com Respectfully submitted, PATENAUDE, Francois, et al.

By: L. Anne Kinsman Registration No. 45,291 SEP 2 2 2005

	Application No.	Applicant(s)	
)	
Notice of Abandonment	09/503,834 Examiner	PATENAUDE,	FRANCOIS
	Domaidus D Bratlovu	2002	
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Application is abandoned in view of: Applicant's failure to timely file a proper reply to the (a) A reply was received on (with a Certificate period for reply (Including a total extension of tines) (b) A proposed reply was received on, but it (A proper reply under 37 CFR 1.113 to a final research.)	te of Mailing or Transmission dated _ ne of month(s)) which expired does not constitute a proper reply ur), which is after the on I on Inder 37 CFR 1.113 (2) ic	the final rejection
application in condition for allowance; (2) a time Continued Examination (RCE) in compliance wit	ly filed Notice of Appeal (with appeal th 37 CFR 1.114).	fee); or (3) a timely filed	Request for
(c) A reply was received on but it does not confinal rejection. See 37 CFR 1.85(a) and 1.111.	onstitute a proper reply, or a bona fid (See explanation in box 7 below).	le attempt at a proper re	ply, to the non-
(d) ⊠ No reply has been received.			
Applicant's failure to timely pay the required issue for from the mailing date of the Notice of Allowance (P)	TOL-85).		
(a) The issue fee and publication fee, if applicable, which is after the expiration of the statut Allowance (PTOL-85).	e, was received on (with a C	ertificate of Mailing or T ee (and publication fee)	ransmission date set in the Notice o
(b) The submitted fee of \$ is insufficient. A ba			
The issue fee required by 37 CFR 1.18 is \$		oy 37 CFR 1.18(d), is \$_	·
(c) The Issue fee and publication fee, if applicable, it			
 Applicant's failure to timely file corrected drawings as Allowability (PTO-37). 			
(a) Proposed corrected drawings were received on after the expiration of the period for reply.	(with a Certificate of Mailing or	r Transmission dated), which is
(b) No corrected drawings have been received.	•		
The letter of express abandonment which is signed the applicants.	by the attorney or agent of record, the	e assignee of the entire	interest, or all of
. The letter of express abandonment which is signed 1.34(a)) upon the filing of a continuing application.	by an attorney or agent (acting in a re	epresentative capacity u	Inder 37 CFR
The decision by the Board of Patent Appeals and Interest of the decision has expired and there are no allowed	terference rendered on and be	ecause the period for se	eking court review
The reason(s) below:		John Barlon Supervisory Patent i Technology Cepter	Exeminer
		9/17	4.3.3

PTOL-1432 (Rev. 04-01)

Notice of Abandonment

Part of Paper No. 20040917



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Pend Winder the Paperwork R	Reduction Act of 1995, no person	Application Number	09/503,8		displays a valid OMB control number.	
TRANS	MITTAL	Filing Date				
	RM	First Named Inventor	Francois	February 15, 2000 Francois PATENAUDE et al.		
, ,	11101	Art Unit	2863			
		Examiner Name		us R. PRET	LOW	
(to be used for all corres) Total Number of Pages in	pondence after initial filing) This Submission 19	Attorney Docket Number		PAT 1952B-2		
Total Number of Pages III		LOSURES (Check al	that apply)	·		
Fee Transmittal F		Drawing(s) Licensing-related Papers		Appea	Allowance Communication to TC all Communication to Board seals and Interferences	
Amendment/Reply After Final Affidavits/declaration(s) Extension of Time Request Express Abandonment Request Information Disclosure Statement Certified Copy of Priority Remar		Petition Petition to Convert to a Provisional Application Power of Attorney, Revocatic Change of Correspondence Terminal Disclaimer Request for Refund CD, Number of CD(s) Landscape Table on C rks On: Office of Petitions	Address Status Letter Other Enclosure(s) (please Ide below): 1. Re-Submission of Petition Revive 2. Copy of Petition to Revive submitted on December 17, 2		etary Information Letter Enclosure(s) (please Identify) bmission of Petition to of Petition to Revive	
	SIGNATURE C	F APPLICANT, ATTO	RNEY, O	R AGENT	· -	
Firm Name Borge	n Ladner Gervais LLP					
Signature	li sa	- 				
Printed name Anne	Kinsman		 .			
Date Septe	mber 22, 2005	·	Reg. No.	15,291		
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This collection of information is required by 37 CFR 1.5. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.11 and 1.14. This collection is estimated to 2 hours to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.